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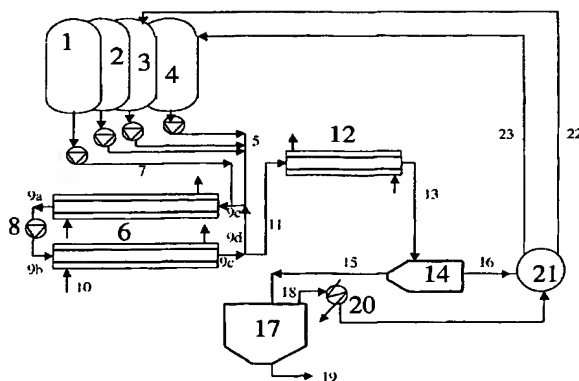
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- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
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- (88) Date of publication of the international search report:
1 April 2004
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PROCESS FOR THE PREPARATION OF A COPOLYMER OF MALEIC ANHYDRIDE AND AN ALKYL VINYL ETHER, COPOLYMERS OF MALEIC ANHYDRIDE AND AN ALKYL VINYL ETHER AND AN APPARATUS



(57) Abstract: Process for the preparation of a copolymer of maleic anhydride and an alkyl vinyl ether, comprising the steps of supplying maleic anhydride and the alkyl vinyl ether and an initiator, together forming a feed flow, through an inlet to a reactor wherein maleic anhydride and the alkyl vinyl ether react to a copolymer of maleic anhydride an alkyl vinyl ether thereby forming a reaction mixture with the maleic anhydride, the alkyl vinyl ether and the initiator characterized in that the process is a continuous process and the reactor is a loop reactor wherein the reaction mixture is internally circulated, whereby this reaction mixture arrives at the inlet before the maleic anhydride and alkyl vinyl ether have completely reacted while a remainder of initiator is still present. The invention further relates to copolymer of maleic anhydride and alkyl vinyl ether, including hydrolyzed or alcoholized copolymers, characterized in that a molecular weight distribution, expressed as Mw/Mn, is less than 2. The invention also relates to an apparatus for conducting the process of the invention.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 03/00044

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08F222/06 C08F216/18 C08F8/12 C08F8/14 B01J19/24
B01J19/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08F B01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | EP 0 919 577 A (BASF AG) 2 June 1999 (1999-06-02) cited in the application examples 1,2 claims 1,4,5 | 1,5,6,8, 11 |
| A | DE 42 36 058 A (BASF AG) 28 April 1994 (1994-04-28) column 1, line 3 -column 2, line 26 | 1,7,11 |
| X | WO 97 21427 A (ISP INVESTMENTS INC) 19 June 1997 (1997-06-19) claims 1,2 | 9,10 |
| A | idem. | 12 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

13 November 2003

Date of mailing of the international search report

11 December 2003

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/NL 03/00044

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-8, 11

Process and apparatus for the preparation of a copolymer of maleic anhydride and an alkyl vinyl ether

2. Claims: 9,10,12

Copolymers and modified copolymers of maleic anhydride and alkyl vinyl ether having a dispersity of less than 2.0

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/NL 03/00044

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
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